SEQUENCE LISTING

<110> Samelson, Lawrence E.
Zhang, Weiguo

<120> Compositions and Methods for Identifying and Testing Tyrosine Kinase Substrates and Their Agonists and Antagonists

<130> NIH-05033

<140> PCT/US98/27400
<141> 1998-12-23

<150> 60/068,690
<151> 1997-12-23

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<170> PatentIn Ver. 2.0

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Pro Pro Val Thr Ser Tyr Pro Pro Leu Ser Gln Pro Asp Leu Leu Pro
65   70   75   80

Ile Pro Arg Ser Pro Gln Pro Leu Gly Gly Ser His Arg Thr Pro Ser
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Ser Ala Phe Ser Met Glu Ser Ile Asp Asp Tyr Val Asn Val Pro Glu
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Ser Gly Glu Ser Ala Glu Ala Ser Leu Asp Gly Ser Arg Glu Tyr Val
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Asn Val Ser Gln Glu Leu His Pro Gly Ala Ala Lys Thr Glu Pro Ala
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Val Ser Tyr Pro Leu Val Thr Ser Phe Pro Pro Leu Arg Gln Pro Asp
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Tyr Glu Asn Gln Glu Pro Ala Cys Lys Asn Val Asp Ala Asp Glu Asp
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Glu Asp Asp Tyr Pro Asn Gly Tyr Leu Val Val Leu Pro Asp Ser Ser
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        35                  40                  45

Ser Leu Val Asp Asp Val Arg Phe His His Phe Pro Ile Glu Arg Gln
    50                  55                  60

Leu Asn Gly Thr Tyr Ala Ile Ala Gly Gly Lys Ala His Cys Gly Pro
65                  70                  75                  80

Ala Glu Leu Cys Gln Phe Tyr Ser Gln Asp Pro Asp Gly Leu Pro Cys
                85                  90                  95

Asn Leu Arg Asn Ala Cys Asn Arg Pro Pro Gly Leu Glu Pro Gln Pro
            100                 105                 110

Gly Val Phe Asp Cys Leu Arg Asp Ala Met Val Arg Asp Tyr Val Arg
        115                 120                 125

Gln Thr Trp Lys Leu Glu Gly Asp Ala Leu Glu Gln Ala Ile Ile Ser
    130                 135                 140

Gln Ala Pro Gln Val Glu Lys Leu Ile Ala Thr Thr Ala His Glu Arg
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Met Pro Trp Tyr His Ser Ser Leu Thr Arg Glu Glu Ala Glu Arg Lys
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Leu Tyr Ser Gly Gln Gln Thr Asp Gly Lys Phe Leu Leu Arg Pro Arg
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Lys Glu Gln Gly Thr Tyr Ala Leu Ser Leu Val Tyr Gly Lys Thr Val
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Tyr His Tyr Leu Ile Ser Gln Asp Lys Ala Gly Lys Tyr Cys Ile Pro
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Glu Gly Thr Lys Phe Asp Thr Leu Trp Gln Leu Val Glu Tyr Leu Lys
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Leu Lys Ala Asp Gly Leu Ile Tyr Arg Leu Lys Glu Val Cys Pro Asn
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Ser Thr Phe Thr Gln Pro Gln Arg Arg Val Asp Thr Leu Asn Ser Asp
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Gly Tyr Thr Pro Glu Pro Ala Arg Leu Ala Ser Ser Thr Asp Lys Pro
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Arg Pro Met Pro Met Asp Thr Ser Val Tyr Glu Ser Pro Tyr Ser Asp
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Pro Glu Glu Leu Lys Asp Lys Lys Leu Phe Leu Lys Arg Glu Asn Leu
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Glu Ala Gln Ile Met His Gln Leu Asp Asn Pro Tyr Ile Val Arg Leu
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Ile Gly Val Cys Gln Ala Glu Ala Leu Met Leu Val Met Glu Met Ala
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Gly Gly Gly Pro Leu His Lys Phe Leu Leu Gly Lys Lys Glu Ile Pro
            420                 425                 430

Val Ser Asn Val Ala Glu Leu Leu His Gln Val Ala Met Gly Met Lys
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Tyr Leu Glu Glu Lys Asn Phe Val His Arg Asp Leu Ala Ala Arg Asn
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Ser Lys Ala Leu Gly Ala Asp Asp Ser Tyr Tyr Thr Ala Arg Ser Ala
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Glu Val Leu Asp Phe Ile Lys Gln Gly Lys Arg Met Glu Cys Pro Pro
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Glu Cys Pro Pro Glu Met Tyr Ala Leu Met Ser Asp Cys Trp Ile Tyr
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Gly Gly Phe Ala Leu Ser Val Ala His Gly Arg Lys Ala His His Tyr
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Thr Ile Glu Arg Glu Leu Asn Gly Thr Tyr Ala Ile Ala Gly Gly Arg
65   70   75   80

Thr His Ala Ser Pro Ala Asp Leu Cys His Tyr His Ser Gln Glu Ser
                85   90   95

Asp Gly Leu Val Cys Leu Leu Lys Lys Pro Phe Asn Arg Pro Gln Gly
            100   105   110

Val Gln Pro Lys Thr Gly Pro Phe Glu Asp Leu Lys Glu Asn Leu Ile
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Arg Glu Tyr Val Lys Gln Thr Trp Asn Leu Gln Gly Gln Ala Leu Glu
    130   135   140

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Leu Ile Arg Ala Arg Asp Asn Asn Gly Ser Tyr Ala Leu Cys Leu Leu
        195                 200                 205

His Glu Gly Lys Val Leu His Tyr Arg Ile Asp Lys Asp Lys Thr Gly
    210                 215                 220

Lys Leu Ser Ile Pro Glu Gly Lys Lys Phe Asp Thr Leu Trp Gln Leu
225                 230                 235                 240

Val Glu His Tyr Ser Tyr Lys Ala Asp Gly Leu Leu Arg Val Leu Thr
                245                 250                 255

Val Pro Cys Gln Lys Ile Gly Thr Gln Gly Asn Val Asn Phe Gly Gly
            260                 265                 270

Arg Pro Gln Leu Pro Gly Ser His Pro Ala Thr Trp Ser Ala Gly Gly
        275                 280                 285

Ile Ile Ser Arg Ile Lys Ser Tyr Ser Phe Pro Lys Pro Gly His Arg
    290                 295                 300

Lys Ser Ser Pro Ala Gln Gly Asn Arg Gln Glu Ser Thr Val Ser Phe
305                 310                 315                 320

Asn Pro Tyr Glu Pro Glu Leu Ala Pro Trp Ala Ala Asp Lys Gly Pro
                325                 330                 335

Gln Arg Glu Ala Leu Pro Met Asp Thr Glu Val Tyr Glu Ser Pro Tyr
            340                 345                 350

Ala Asp Pro Glu Glu Ile Arg Pro Lys Glu Val Tyr Leu Asp Arg Lys
        355                 360                 365

Leu Leu Thr Leu Glu Asp Lys Glu Leu Gly Ser Gly Asn Phe Gly Thr
    370                 375                 380

Val Lys Lys Gly Tyr Tyr Gln Met Lys Lys Val Val Lys Thr Val Ala
385                 390                 395                 400

Val Lys Ile Leu Lys Asn Glu Ala Asn Asp Pro Ala Leu Lys Asp Glu
                405                 410                 415

Leu Leu Ala Glu Ala Asn Val Met Gln Gln Leu Asp Asn Pro Tyr Ile
            420                 425                 430

Val Arg Met Ile Gly Ile Cys Glu Ala Glu Ser Trp Met Leu Val Met
        435                 440                 445

Glu Met Ala Glu Leu Gly Pro Leu Asn Lys Tyr Leu Gln Gln Asn Arg
    450                 455                 460

His Val Lys Asp Lys Asn Ile Ile Glu Leu Val His Gln Val Ser Met
465                 470                 475                 480

Gly Met Lys Tyr Leu Glu Glu Ser Asn Phe Val His Arg Asp Leu Ala
                485                 490                 495

Ala Arg Asn Val Leu Leu Val Thr Gln His Tyr Ala Lys Ile Ser Asp
            500                 505                 510
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Phe Gly Leu Ser Lys Ala Leu Arg Ala Asp Glu Asn Tyr Tyr Lys Ala
        515                 520                 525

Gln Thr His Gly Lys Trp Pro Val Lys Trp Tyr Ala Pro Glu Cys Ile
    530                 535                 540

Asn Tyr Tyr Lys Phe Ser Ser Lys Ser Asp Val Trp Ser Phe Gly Val
545                 550                 555                 560

Leu Met Trp Glu Ala Phe Ser Tyr Gly Gln Lys Pro Tyr Arg Gly Met
                565                 570                 575

Lys Gly Ser Glu Val Thr Ala Met Leu Glu Lys Gly Glu Arg Met Gly
            580                 585                 590

Cys Pro Ala Gly Cys Pro Arg Glu Met Tyr Asp Leu Met Asn Leu Cys
        595                 600                 605

Trp Thr Tyr Asp Val Glu Asn Arg Pro Gly Phe Ala Ala Val Glu Leu
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Arg Leu Arg Asn Tyr Tyr Tyr Asp Val Val Asn
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<212> DNA
<213> Homo sapiens

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<210> 11
<211> 176
<212> PRT
<213> Homo sapiens

<400> 11
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Met Glu Ala Ile Ala Lys Tyr Asp Phe Lys Ala Thr Ala Asp Asp Glu
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Leu Ser Phe Lys Arg Gly Asp Ile Leu Lys Val Leu Asn Glu Glu Cys
             20                  25                  30

Asp Gln Asn Trp Tyr Lys Ala Glu Leu Asn Gly Lys Asp Gly Phe Ile
         35                  40                  45
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Pro Lys Asn Tyr Ile Glu Met Lys Pro His Pro Phe Gly Asn Asp Val
    50   55   60

Gln His Phe Lys Val Leu Arg Asp Gly Ala Gly Lys Tyr Phe Leu Trp
65   70   75   80

Val Val Lys Phe Asn Ser Leu Asn Glu Leu Val Asp Tyr His Arg Ser
                85   90   95

Thr Ser Val Ser Arg Asn Gln Gln Ile Phe Leu Arg Asp Ile Glu Gln
            100   105   110

Val Pro Gln Gln Pro Thr Tyr Val Gln Ala Leu Phe Asp Phe Asp Pro
        115   120   125

Gln Glu Asp Gly Glu Leu Gly Phe Arg Arg Gly Asp Phe Ile His Val
    130   135   140

Met Asp Asn Ser Asp Pro Asn Trp Trp Lys Gly Ala Cys His Gly Gln
145   150   155   160

Thr Gly Met Phe Pro Arg Asn Tyr Val Thr Pro Val Asn Arg Asn Val
                165   170   175

<210> 12
<211> 2758
<212> DNA
<213> Homo sapiens

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<210> 13
<211> 797
<212> PRT
<213> Homo sapiens

<400> 13
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Thr Cys Cys Glu Lys Phe Gly Leu Lys Arg Ser Glu Leu Phe Glu Ala
35 40 45

Phe Asp Leu Phe Asp Val Gln Asp Phe Gly Lys Val Ile Tyr Thr Leu
50 55 60

Ser Ala Leu Ala Trp Thr Pro Ile Ala Gln Asn Arg Gly Ile Met Pro
65 70 75 80

Phe Pro Thr Glu Glu Glu Ser Val Gly Asp Glu Asp Ile Tyr Ser Gly
85 90 95

Leu Ser Asp Gln Ile Asp Asp Thr Val Glu Glu Asp Glu Asp Leu Tyr
100 105 110

Asp Cys Val Glu Asn Glu Glu Ala Glu Gly Asp Glu Ile Tyr Glu Asp
115 120 125

Leu Met Arg Ser Glu Pro Val Ser Met Pro Pro Lys Met Thr Glu Tyr
130 135 140

Asp Lys Arg Cys Cys Cys Leu Arg Glu Ile Gln Gln Thr Glu Glu Lys
145 150 155 160

Tyr Thr Asp Thr Leu Gly Ser Ile Gln Gln His Phe Leu Lys Pro Leu
165 170 175

Gln Arg Phe Leu Lys Pro Gln Asp Ile Glu Ile Ile Phe Ile Asn Ile
180 185 190

Glu Asp Leu Leu Arg Val His Thr His Phe Leu Lys Glu Met Lys Glu
195 200 205

Ala Leu Gly Thr Pro Gly Ala Pro Asn Leu Tyr Gln Val Phe Ile Lys
210 215 220

Tyr Lys Glu Arg Phe Leu Val Tyr Gly Arg Tyr Cys Ser Gln Val Glu
225 230 235 240

Ser Ala Ser Lys His Leu Asp Arg Val Ala Ala Ala Arg Glu Asp Val
245 250 255

Gln Met Lys Leu Glu Glu Cys Ser Gln Arg Ala Asn Asn Gly Arg Phe
260 265 270

Thr Ala Arg Pro Ala Asp Gly Ala Tyr Ala Ala Ser Ser Gln Ile Ser
275 280 285

Pro Pro Ser Pro Gly Ala Gly Glu Thr His Ala Gly Gly Asp Gly Ala
290 295 300

Arg Lys Leu Arg Leu Ala Leu Asp Ala Met Arg Asp Leu Ala Gln Cys
305 310 315 320

Val Asn Glu Val Lys Arg Asp Asn Glu Thr Leu Arg Gln Ile Thr Asn
325 330 335

Phe Gln Leu Ser Ile Glu Asn Leu Asp Gln Ser Leu Ala His Tyr Gly
340 345 350

Arg Pro Lys Ile Asp Gly Glu Leu Lys Ile Thr Ser Val Glu Arg Arg
355 360 365

Ser Lys Met Asp Arg Tyr Ala Phe Leu Leu Asp Lys Ala Leu Leu Ile
370 375 380

Cys Lys Arg Arg Gly Asp Ser Tyr Asp Leu Lys Asp Phe Val Asn Leu
385 390 395 400

His Ser Phe Gln Val Arg Asp Asp Ser Ser Gly Asp Arg Asp Asn Lys
405 410 415

Lys Trp Ser His Met Phe Leu Leu Ile Glu Asp Gln Gly Ala Gln Gly
420 425 430

Tyr Glu Leu Phe Phe Lys Thr Arg Glu Leu Lys Lys Lys Trp Met Glu
435 440 445

Gln Phe Glu Met Ala Ile Ser Asn Ile Tyr Pro Glu Asn Ala Thr Ala
450 455 460

Asn Gly His Asp Phe Gln Met Phe Ser Phe Glu Glu Thr Thr Ser Cys
465 470 475 480

Lys Ala Cys Gln Met Leu Leu Arg Gly Thr Phe Tyr Gln Gly Tyr Arg
485 490 495

Cys His Arg Cys Arg Ala Ser Ala His Lys Glu Cys Leu Gly Arg Val
500 505 510

Pro Pro Cys Gly Arg His Gly Gln Asp Phe Pro Gly Thr Met Lys Lys
515 520 525

Asp Lys Leu His Arg Arg Ala Gln Asp Lys Lys Arg Asn Glu Leu Gly
530 535 540

Leu Pro Lys Met Glu Val Phe Gln Glu Tyr Tyr Gly Leu Pro Pro Pro
545 550 555 560

Pro Gly Ala Ile Gly Pro Phe Leu Arg Leu Asn Pro Gly Asp Ile Val
565 570 575

Glu Leu Thr Lys Ala Glu Ala Glu Gln Asn Trp Trp Glu Gly Arg Asn
580 585 590

Thr Ser Thr Asn Glu Ile Gly Trp Phe Pro Cys Asn Arg Val Lys Pro
595 600 605

Tyr Val His Gly Pro Pro Gln Asp Leu Ser Val His Leu Trp Tyr Ala
610 615 620

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Gly Pro Met Glu Arg Ala Gly Ala Glu Ser Ile Leu Ala Asn Arg Ser
625                 630                 635                 640

Asp Gly Thr Phe Leu Val Arg Gln Arg Val Lys Asp Ala Ala Glu Phe
                645                 650                 655

Ala Ile Ser Ile Lys Tyr Asn Val Glu Val Lys His Thr Val Lys Ile
            660                 665                 670

Met Thr Ala Glu Gly Leu Tyr Arg Ile Thr Glu Lys Lys Ala Phe Arg
        675                 680                 685

Gly Leu Thr Glu Leu Val Glu Phe Tyr Gln Gln Asn Ser Leu Lys Asp
    690                 695                 700

Cys Phe Lys Ser Leu Asp Thr Thr Leu Gln Phe Pro Phe Lys Glu Pro
705                 710                 715                 720

Glu Lys Arg Thr Ile Ser Arg Pro Ala Val Gly Ser Thr Lys Tyr Phe
                725                 730                 735

Gly Thr Ala Lys Ala Arg Tyr Asp Phe Cys Ala Arg Asp Arg Ser Glu
            740                 745                 750

Leu Ser Leu Lys Glu Gly Asp Ile Ile Lys Ile Leu Asn Lys Lys Gly
        755                 760                 765

Gln Gln Gly Trp Trp Arg Gly Glu Ile Tyr Gly Arg Val Gly Trp Phe
    770                 775                 780

Pro Ala Asn Tyr Val Glu Glu Asp Tyr Ser Glu Tyr Cys
785                 790                 795
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<210> 14
<211> 3090
<212> DNA
<213> Homo sapiens

<400> 14

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<210> 15
<211> 906
<212> PRT
<213> Homo sapiens

<400> 15
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Phe Gln Pro His His His His His His His Leu Ser Pro His Pro Pro
35 40 45

Gly Thr Val Asp Lys Lys Met Val Glu Lys Cys Trp Lys Leu Met Asp
50 55 60

Lys Val Val Arg Leu Cys Gln Asn Pro Lys Leu Ala Leu Lys Asn Ser
65 70 75 80

Pro Pro Tyr Ile Leu Asp Leu Leu Pro Asp Thr Tyr Gln His Leu Arg
85 90 95

Thr Ile Leu Ser Arg Tyr Glu Gly Lys Met Glu Thr Leu Gly Glu Asn
100 105 110

Glu Tyr Phe Arg Val Phe Met Glu Asn Leu Met Lys Lys Thr Lys Gln
115 120 125

Thr Ile Ser Leu Phe Lys Glu Gly Lys Glu Arg Met Tyr Glu Glu Asn
130 135 140

Ser Gln Pro Arg Arg Asn Leu Thr Lys Leu Ser Leu Ile Phe Ser His
145 150 155 160

Met Leu Ala Glu Leu Lys Gly Ile Phe Pro Ser Gly Leu Phe Gln Gly
165 170 175

Asp Thr Phe Arg Ile Thr Lys Ala Asp Ala Ala Glu Phe Trp Arg Lys
180 185 190

Ala Phe Gly Glu Lys Thr Ile Val Pro Trp Lys Ser Phe Arg Gln Ala
195 200 205

Leu His Glu Val His Pro Ile Ser Ser Gly Leu Glu Ala Met Ala Leu
210 215 220

Lys Ser Thr Ile Asp Leu Thr Cys Asn Asp Tyr Ile Ser Val Phe Glu
225 230 235 240

Phe Asp Ile Phe Thr Arg Leu Phe Gln Pro Trp Ser Ser Leu Leu Arg
245 250 255

Asn Trp Asn Ser Leu Ala Val Thr His Pro Gly Tyr Met Ala Phe Leu
260 265 270

Thr Tyr Asp Glu Val Lys Ala Arg Leu Gln Lys Phe Ile His Lys Pro
275 280 285

Gly Ser Tyr Ile Phe Arg Leu Ser Cys Thr Arg Leu Gly Gln Trp Ala
290 295 300

Ile Gly Tyr Val Thr Ala Asp Gly Asn Ile Leu Gln Thr Ile Pro His
305 310 315 320

Asn Lys Pro Leu Phe Gln Ala Leu Ile Asp Gly Phe Arg Glu Gly Phe
325 330 335

Tyr Leu Phe Pro Asp Gly Arg Asn Gln Asn Pro Asp Leu Thr Gly Leu
340 345 350

Cys Glu Pro Thr Pro Gln Asp His Ile Lys Val Thr Gln Glu Gln Tyr
355 360 365

Glu Leu Tyr Cys Glu Met Gly Ser Thr Phe Gln Leu Cys Lys Ile Cys
370 375 380

Ala Glu Asn Asp Lys Asp Val Lys Ile Glu Pro Cys Gly His Leu Met
385 390 395 400

Cys Thr Ser Cys Leu Thr Ser Trp Gln Glu Ser Glu Gly Gln Gly Cys
405 410 415

Pro Phe Cys Arg Cys Glu Ile Lys Gly Thr Glu Pro Ile Val Val Asp
420 425 430

Pro Phe Asp Pro Arg Gly Ser Gly Ser Leu Leu Arg Gln Gly Ala Glu
435 440 445

Gly Ala Pro Ser Pro Asn Tyr Asp Asp Asp Asp Asp Glu Arg Ala Asp
450 455 460

Asp Thr Leu Phe Met Met Lys Glu Leu Ala Gly Ala Lys Val Glu Arg
465 470 475 480

Pro Pro Ser Pro Phe Ser Met Ala Pro Gln Ala Ser Leu Pro Pro Val
485 490 495

Pro Pro Arg Leu Asp Leu Leu Pro Gln Arg Val Cys Val Pro Ser Ser
500 505 510

Ala Ser Ala Leu Gly Thr Ala Ser Lys Ala Ala Ser Gly Ser Leu His
515 520 525

Lys Asp Lys Pro Leu Pro Val Pro Pro Thr Leu Arg Asp Leu Pro Pro
530 535 540

Pro Pro Pro Pro Asp Arg Pro Tyr Ser Val Gly Ala Glu Ser Arg Pro
545 550 555 560

Gln Arg Arg Pro Leu Pro Cys Thr Pro Gly Asp Cys Pro Ser Arg Asp
565 570 575

Lys Leu Pro Pro Val Pro Ser Ser Arg Leu Gly Asp Ser Trp Leu Pro
580 585 590

Arg Pro Ile Pro Lys Val Pro Val Ser Ala Pro Ser Ser Ser Asp Pro
595 600 605

Trp Thr Gly Arg Glu Leu Thr Asn Arg His Ser Leu Pro Phe Ser Leu
610 615 620

Pro Ser Gln Met Glu Pro Arg Pro Asp Val Pro Arg Leu Gly Ser Thr
625 630 635 640

Phe Ser Leu Asp Thr Ser Met Ser Met Asn Ser Ser Pro Leu Val Gly
645 650 655

Pro Glu Cys Asp His Pro Lys Ile Lys Pro Ser Ser Ser Ala Asn Ala
660 665 670

Ile Tyr Ser Leu Ala Ala Arg Pro Leu Pro Val Pro Lys Leu Pro Pro
675 680 685

Gly Glu Gln Cys Glu Gly Glu Glu Asp Thr Glu Tyr Met Thr Pro Ser
690 695 700

Ser Arg Pro Leu Arg Pro Leu Asp Thr Ser Gln Ser Ser Arg Ala Cys
705 710 715 720

Asp Cys Asp Gln Gln Ile Asp Ser Cys Thr Tyr Glu Ala Met Tyr Asn
725 730 735

Ile Gln Ser Gln Ala Pro Ser Ile Thr Glu Ser Ser Thr Phe Gly Glu
740 745 750

Gly Asn Leu Ala Ala Ala His Ala Asn Thr Gly Pro Glu Glu Ser Glu
755 760 765

Asn Glu Asp Asp Gly Tyr Asp Val Pro Lys Pro Pro Val Pro Ala Val
770 775 780

Leu Ala Arg Arg Thr Leu Ser Asp Ile Ser Asn Ala Ser Ser Ser Phe
785 790 795 800

Gly Trp Leu Ser Leu Asp Gly Asp Pro Thr Thr Asn Val Thr Glu Gly
805 810 815

Ser Gln Val Pro Glu Arg Pro Pro Lys Pro Phe Pro Arg Arg Ile Asn
820 825 830

Ser Glu Arg Lys Ala Gly Ser Cys Gln Gln Gly Ser Gly Pro Ala Ala
835 840 845

Ser Ala Ala Thr Ala Ser Pro Gln Leu Ser Ser Glu Ile Glu Asn Leu
850 855 860

Met Ser Gln Gly Tyr Ser Tyr Gln Asp Ile Gln Lys Ala Leu Val Ile
865 870 875 880

Ala Gln Asn Asn Ile Glu Met Ala Lys Asn Ile Leu Arg Glu Phe Val
885 890 895

Ser Ile Ser Ser Pro Ala His Val Ala Thr
900 905